

Morrison (W. H.)

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Linear Craniotomy for Defective
Mental Development

BY

WILLIAM H. MORRISON, M.D.

PHILADELPHIA, PA.

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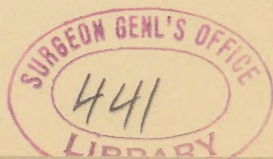
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WHEN a new procedure is suggested for the relief of any affection, it is desirable that all cases subjected to it should be placed on record, in order that its advantages and disadvantages may be learned and its limitations speedily fixed. It is with this thought in view that the subjoined case is reported.

August 30, 1888, I delivered Mrs. L——, aged eighteen years, of her first child. The presentation was occipito-posterior, the occiput rotating into the hollow of the sacrum. Delivery was accomplished with the forceps after moderately prolonged effort. The child was a large male and had apparently suffered no harm. There was no depression of the skull or other sign of injurious compression. Two days later, however, a spot of sloughing skin appeared, just posterior to the angular process of the left frontal bone, leaving an ulcer one inch in diameter, which after a time cicatrized. The child developed physically fairly well, but it was observed as he grew older that he was not as bright as other children. He did not



try to talk, nor did he make any attempt to stand or walk. He could not comprehend what was said to him.

In reference to family history it may be said that the father is twenty-three years of age, temperate and healthy mentally and physically. The same is true of the mother. On neither the paternal nor the maternal side is there any known tendency to mental disease or deficiency. There have been two children born since the birth of the subject of this paper. One is now eighteen months of age and perfectly normal in all respects, is bright, talks and runs around; the other is three months of age and its mental condition is apparently normal.

November 29, 1890, Dr. W. W. Keen published¹ the report of his first case of "Craniectomy for Microcephalus," giving an abstract of the cases of Lannelongue. I at once suggested the operation to the parents of this child, calling attention to the possibility of improvement and explaining the dangers of the procedure. The operation was accepted, but its performance postponed on account of the fact that the mother was nearing the end of her third pregnancy and it was thought advisable to wait until this was completed. The parents were urged in the meantime to try to teach the child to walk and to talk. During the next four months the child was under constant observation and every effort was made to improve its condition, but no effect could be observed.

The condition of the child at the time of the operation was as follows: M. L——, male, aged two years and five months; height, 32 inches; length of right leg, $15\frac{3}{4}$ inches; length of left leg, $15\frac{3}{8}$ inches, a difference of $\frac{3}{8}$ of an inch; circumference at middle of thighs, $8\frac{1}{2}$ inches. The measurements of the head were—occipito-frontal circumference, $18\frac{1}{2}$ inches; semi-circumferences from one external auditory meatus to the other, 12 inches; antero-posterior diameter, $6\frac{1}{2}$ inches; bi-parietal diameter, $4\frac{3}{4}$ inches; bi-frontal diameter, $3\frac{7}{8}$ inches.

He is able to sit alone, but cannot stand. He moves

¹ Medical News.

from one place to another by sliding on his buttocks. There is some contraction of the gastrocnemii muscles, so that when he is supported on his feet the body is thrown backward. The grasp of the two hands is equal and strong. The right patellar reflex seems absent, the left is normal. There is no apparent paresis or paralysis of the muscles of the legs. He is unable to talk. He can utter a few words. "Bert," "baby," "six," and "seven" is the extent of his vocabulary, and it is seldom that he can be induced to say even these. He cannot understand what is said to him. His only means of indicating that he wants something is by crying, and it is only by offering him various articles that it can be determined what he desires. His attention can be gained with difficulty and when gained, can be held but for a moment. He does not show that he understands when his name is called. Almost every day he has, without apparent cause, spells of crying without tears, which will continue for two or three hours. When pleased he will show it by a broad, idiotic smile. He eats fairly well and is well nourished. There is no incontinence of bladder or bowels.

The operation was performed April 17, 1891, with the assistance of Dr. H. A. P. Neel and Dr. E. E. Keiser. Ether was administered and the head shaved and then washed with soap and water followed by ether and bichloride of mercury (1 to 2,000) solution; antiseptic precautions were practised throughout the operation. An incision was made through the scalp, beginning at the line of the hair, two inches above the superior edge of the left orbit, and extending backward eight inches parallel with the median line, and three-fourths of an inch distant from it. Bleeding was controlled by hæmostatic forceps. During the early part of the operation a rubber tube was placed around the head to prevent bleeding, but it was found unnecessary and was laid aside. A one-half inch trephine was applied at the anterior angle of the wound, its centre being three-fourths of an inch from the median line, being so placed that the section in the bone would

not correspond with the incision in the scalp. The button of bone removed was one-sixteenth of an inch in thickness. With the rongeur forceps, as modified by Dr. W. W. Keen, a strip of the skull three-eighths of an inch wide was removed, beginning at the trephine opening and extending backward seven inches, parallel with the median line and one-half inch distant from it. The posterior extremity of the bone section was one inch anterior to the extremity of the skin incision. The dura mater appeared healthy and was not markedly adherent. Bleeding from the bone stopped spontaneously, and no ligatures were required for the scalp vessels. The wound was thoroughly cleansed and united by numerous silk sutures. A few strands of catgut were placed at each extremity of the wound for drainage and a moist bichloride dressing applied.

During the next few hours vomiting occurred and was frequently repeated. There was considerable restlessness through the night and the child kept up a constant kicking movement. Fluid extract of ergot and camphorated tincture of opium were given in small doses, frequently repeated, but with little effect. The kicking movement continued during the next day (April 18th), and bromide of potassium was substituted for the ergot and opium. The temperature now began to rise, so that by evening it had reached 103° F. There was no vomiting and no apparent pain. Calomel was given to open the bowels, and three grains of antipyrine were given at 7 P.M., and the dose repeated at 10 P.M.

The following day (April 19th), the temperature in the morning was 99° F., and he had slept well during the night. His father stated that on being asked if his medicine were good, the child had uttered an emphatic "no," a word that he had never been heard to utter. During the day he rested well, but by evening the temperature had reached 101.5° F. The dressing was now removed for the first time, and it was found that the incision had united by first intention throughout its extent, with the

exception of the points at which the catgut emerged. This had, however, failed to act as a drain, and the scalp over the section in the skull was bulging. The catgut was removed and there was a free discharge of serum, with some pus, from the posterior opening. A short rubber drainage-tube was introduced, and as the incision had been extended over the sound bone, its inner end did not come in contact with the dura. The wound was redressed with iodoform and bichloride gauze. It is probable that the kicking movements noted above were due to irritation of the leg-centres caused by the presence of the effusion. From this time, the course was uneventful, the discharge rapidly diminished, union became firm and by May 1st, two weeks after the operation, the wound was healed.

Signs of improvement in the mental condition were noted within a week after the operation, principally in the fact that his attention could readily be gained and held. When spoken to he would look toward the speaker and follow him with his eyes. The father's statement that the boy had said "no," a word he had never been heard to use, less than two days after the operation, has been noted. At the time this was considered rather as an effect of the imagination on the part of the father, but as a few days later the child again used the word several times and has continued to do so, the observation was probably correct. In the course of two or three weeks he was able to indicate food or drink by pointing toward the desired article. He soon added "yes," "stop," and some other words to his vocabulary. He would stand for a short time if placed by a chair, but seemed to fear that he might fall.

June 7th.—A careful examination of the child shows no apparent alteration in the measurements of the head. Since the operation there has been a continuous, gratifying improvement in the mental condition. The facial expression is much more intelligent. He notices and takes an interest in what is going on around him. He

looks up when called by name. He can walk across the room when steadied by the hands. He will stand at a chair for a long time and for a few seconds has stood unsupported. The nutrition of the lower extremities has improved decidedly, but there is still slight contraction of the gastrocnemii. He makes constant efforts to talk and is gaining new words. When charged with doing something that he should not do, he says "I didn't;" when teased, will cry "Stop!" When asked where certain members of the family are, he will look toward the one indicated. He does not have the unmeaning crying spells to which he had been subject, nor does he roll the head from side to side as he did before the operation.

Until the suggestion of Lannelongue, about a year ago, the only hope for these unfortunate feeble-minded children lay in education, a measure not attended with the most satisfactory results. It does not seem logical to suppose that this procedure will benefit a large proportion of these cases, for in many there is probably more than a relative disproportion between the development of the brain and its bony covering; but even if a small number be reclaimed from utter idiocy and permitted even a moderate intellectual development, it is so much gained, and would justify a procedure attended with much greater risk to life than is linear craniotomy. The case now reported makes the eighth to be placed on record in this country. Of these, two have died shortly after operation, and one was reported so soon after the operation that the presence or absence of improvement could not be determined. In the remaining five, as well as in the two cases reported by Lannelongue,¹ there has been a definite improvement observed. The cases so far operated upon have, however, been too few, and the time that has elapsed since operation, too short to enable any definite conclusions to be presented; but the fact that there has been decided improvement immediately following the

¹ L'Union Medical, July 8, 1890.

operation clearly shows the relation of effect to cause, and warrants a continuance of the operation in these otherwise unpromising cases.

It is rare that any operation suggested for the relief of a definite affection limits its application to that condition. So it will probably prove with this operation of linear craniotomy. This thought is suggested by a case now under observation, that of a boy, aged ten, with a rather small head, and a mental development below the average, who, for several years, has been the subject of constant attacks of petit mal, varying in number from ten to twenty daily. With these there are occasional severe epileptic seizures at intervals of two or three weeks to as many months. In some of the major attacks it has been noted that the right side of the face and right arm have been distinctly more involved than the other parts of the body. There is no traumatic history, and no evidence of scar on the shaven scalp. In this case the proper course seems to be to make an exploratory operation and examine the region of the face and arm-centres for the right side, and failing to find there any explanation of the epilepsy, to do a linear craniotomy. Certainly it seems logical to suppose that if a certain disproportion between the size of the skull and the brain is sufficient to hold the functions of that organ in abeyance, a slighter disproportion might give rise to irritation of the brain, placing it in a condition of unstable equilibrium, so that the slightest cause would be sufficient to induce motor and other phenomena.

